XXX. *A Letter to* Mathew Maty, *M. D. Sec. R S.; containing ſome Obſervations on a ſingular Sparry Incruſtation found in* Somerſetſhire. *By* Edward King, *Eſquire, F. R. S.*

John Street, Dec. 18, 1772.

SIR,

Read March 25, 1773.

THE ſummer before laſt, when I was in Somerſetſhire, I received a preſent of a very curious foſſil from the Rev. Mr. Catcott of Briſtol, a gentleman who has taken much pains to collect the foſſil bodies of that County, and is very indefatigable in his reſearches. And as ſome few ſingular obſervations occur to me with regard to this extraordinary maſs, I take the liberty to trouble you with them; and requeſt, if you think them at all deſerving any conſideration, that they may be laid before the Society, together with a drawing of the foſſil, (Tab. X.) and with the very exact account I received of its production from Mr. Catcott.

In the pariſh of High Littleton, in the County of Somerſet, ſituated about midway between Briſtol and Wells, are ſeveral Coal-mines; and about the end of the year 1766, a new ſhaft (or pit) was opened, for the purpoſe of conveying air into an adjoining work, called Mearn's coal-pit; but when this ſhaft was finiſhed, the water that flowed in from the ſides, and which at firſt was taken up by buckets, greatly incommoded the under-works; and therefore, to prevent this inconvenience, the miners, at about the depth of ten fathom, and juſt below the place where the water broke in, affixed to the four ſides of the pit ſome wooden ſhoots (as repreſented at Fig. 2.), about four or five inches wide, and as many deep; all of them a little inclined towards one corner, where was a hollow perpendicular pipe or trunk of elm, nearly a long ſquare (as repreſented at A), being about ſeven inches and an half one way, and four inches and an half the other; and through this the water, that fell into the lateral ſhoots, was conveyed down to the level (or paſſage out); which being about ſeven fathoms lower than the ſhoots, the hollow perpendicular trunk was about fourteen yards in length.

This trunk having been thus fixed up, in the latter end of the year 1766, was in about three years time, or rather leſs, found to be much obſtructed, and ſtopped up; ſo that, in Auguſt 1769, the miners were obliged to take it up: and then, on examining it, and taking it to pieces, they found the whole cavity, from one end to the other, nearly filled with a ſort of ſparry incruſtation, ſomewhat ſofter than marble, but harder than alabaſter, and which therefore I ſhall venture to call a ſpecies of marble. And the ſpecimen now laid before the Society, and repreſented by the drawing (Fig. 1.), and alſo another ſpecimen of the like ſort, preſented to the Society, are merely tranſverſe ſections of the ſubſtance, with which the pipe was filled.

The water, that flowed into the pit on all ſides, iſſued from a ſtratum of hard brown and reddiſh ſand-ſtone, replete with ſhining ſparry *micæ*, and ſome ocherous matter; and had, in its paſſage through the trunk, regularly filled up the cavity, by ſlow degrees, with ſolid incruſtations; inſomuch, that the increaſe of the marble is marked much in the ſame manner as the increaſe of the growth of a tree appears to be, when the trunk of it is cut horizontally: and at laſt the water had left only the cavity, which now appears in the middle of the block, and which was uniform in its figure from one end of the pipe to the other, and nearly ſimilar to the original cavity; but which, at laſt, not being large enough to let all the water paſs, occaſioned the diſcovery. Since that time, in order to prevent the inconvenience (if poſſible) a new trunk has been made, larger than the firſt; and yet, in June 1771, this new trunk alſo was ſo far filled up with the ſparry incruſtation, that there was but juſt room to thruſt four fingers into the central cavity; and the lateral ſhoots, or troughs, alſo have filled ſo faſt, that they have been obliged, every now and then, to clean them out.

This, Sir, is the hiſtory of the ſpecimen now laid before the Society, and of the Mine from whence it came; and the obſervations I would beg leave to make, are the following.

1ſt, As the water flowed in from the ſhoots, on two ſides of the ſquare trunk or pipe, it is manifeſt that the ſtreams muſt have ſtricken againſt each other,

other, at the corner of the pipe where they firſt met, and alſo at the oppoſite corner. And, as it is a known principle of mechanics, that a body, which is acted upon by two forces moving in different directions, will deſcribe the diagonal of a parallelogram, of which the directions of thoſe forces ſhall be the ſides; ſo here, the line in which the two ſtreams met, and impeded each other's motion, has plainly, as the marble increaſed, gone on in the diagonal of ſuch a parallelogram from both the corners; viz. from that where the pipe joined the ſhoots, or troughs, and from the oppoſite one: but it is alſo very remarkable, that there is ſuch a diagonal line, not only at theſe corners, but in like manner at the other two; which can be accounted for no otherwiſe, than by ſuppoſing that each of the two ſtreams, daſhing againſt the oppoſite ſide of the pipe, formed continually, the whole way down, another ſtream, in a contrary direction, as repreſented in Fig. 3; and ſo, both together, produced the ſame effect throughout the whole pipe, as if there had been four ſtreams flowing over the four ſides. Upon examining the block, however, very ſtrictly, it appears, that the lines in the diagonal one way, are ſtronger than thoſe in the diagonal the other way; and indeed the ſpecimen of the pipe, preſented to the Society, has even broken in halves, exactly in one of the diagonals, though the block here deſcribed remains intire, and has the appearance of having had its ſides joined accurately, in the manner in which a ſkilful workman would fit four boards to be glued together.

2dly,

2dly, At the place marked B, Fig. 1, there ſeems to have been, by ſome accident or other, the point of a ſmall nail projecting into the pipe; and here, it is very remarkable, that, either by the daſhing of the water, or rather perhaps by an effect which iron has been obſerved to have of haſtening and increaſing petrification, the incruſtation has gone on faſter than in other parts of the ſame ſide; but ſo regularly, that, from the point of the nail to the inner cavity, there is a ſwelling, or protuberance, ſo uniform, that it makes throughout nearly the ſame ſegment of different circles, of which the point of the nail is the common center; and that not merely directly oppoſite to the nail, but throughout this whole block and even further downwards.

3dly, The regular increaſe of theſe ſegments of circles is viſible in each *lamina* of the block (if I may be allowed that expreſſion), and in each *lamina* the diameter of the circle increaſes in due proportion; ſo that it is ſtill nearly the ſame ſegment; though, if there be any difference, it is rather a ſmaller portion of a larger circle; as, from the cauſe which occaſioned it, one would be led to expect. And with regard to theſe *laminæ*, it is worth obſerving, that as they mark the increaſe of the marble uniformly all round, as the growth of a tree is marked (only the marble increaſed inward, whereas a tree grows outward) ſo they ſeem to have become viſible, and to have been thus diſtinctly marked, by means of the water bringing, at different times, more or leſs oker along with the ſparry matter: and this is the more probable, as the whole country all round abounds with beds of oker, and the waters are ſometimes much tinged with it.

4thly, The cavity left in the middle of the block is not perfectly ſimilar to the original cavity of the trunk, or pipe; becauſe the water did not flow quite uniformly over the edges, at the ends of the ſhoots or troughs, in conſequence, probably, of their not lying exactly horizontally: whence, more water fell upon and againſt one part of the ſides of the trunk, than againſt the other.

5thly, The outſide of the block has taken off impreſſions of all the roughneſſes, knots, and ſhivers of the elm boards, which compoſed the trunk or pipe, even more accurately than they could have been taken off by wax, plaiſter of Paris, or almoſt any compoſition whatever, and certainly much more durably: which impreſſions, although they are not ſo well repreſented in the drawing, in conſequence of their fineneſs, yet appear ſufficiently plain, both on the ſpecimen here deſcribed, and on that preſented to the Society, and are exceedingly well deſerving of notice.

There is in the Philoſophical Tranſactions (Vol. LX. p. 47.) a very curious paper, from our learned foreign Member R. E. Raſpe, concerning the production of white marble in a ſimilar manner; in which paper he mentions the taking off impreſſions of medallions, by means of petrifying waters. And I remember a paper was read at the Royal Society ſome time ago, containing an account of ſeveral impreſſions, actually ſo taken off in a ſhort time, in durable marble, by means of a petrifying water, near Bologna in Italy: when ſome of the impreſſions were alſo ſent, both to the

the Royal Society, and to the Britiſh Muſeum. And, as this block here deſcribed, and the whole contents of the pipe, of above forty feet in length, were formed in leſs than three years, there is reaſon to conclude, that the water of this Mine in Somerſetſhire is as capable of being improved to the purpoſes of a new manufactory, as either that near Bologna, or thoſe of Germany and Bohemia. And it is perhaps worth mentioning, that ſomething of this ſort has actually been attempted, with good ſucceſs, in Peru; for we are told by P. Feuillée (who made ſeveral curious obſervations in South America, both phyſiological and aſtronomical, in 1709), that he ſaw many ſtatues and beautiful vaſes (or holy water pots), in the churches at Lima, which were ſimply caſt in moulds, by means alone of a petrifying water near Guankabalika, or Guankavelika. And this circumſtance is alſo mentioned (p. 236.), in a Deſcription of Peru, publiſhed in 1748, a great part of which is taken from Feuillée's account.

6thly, This block of marble takes a very fine poliſh, as appears by the ſpecimen, the ſections of which are poliſhed; and if caſts of medals, or other things, were taken in ſmooth moulds, well formed, their ſurfaces would, therefore, probably appear well poliſhed, as thoſe of the medals did, which came from Bologna.

7thly and laſtly, I would only add, that Dr. Pococke, in his Travels (Vol. II. p. 264.), deſcribing a very curious grotto in the iſland of Candia, or Crete, which exceeded all others that he ever ſaw in beauty, and the ſlenderneſs of the pillars, one of which is near twenty feet high, and even tranſparent, ſays,

ſays, " As I had ſeen ſtones of this kind hewn out " of a rock at Mount Lebanon, which were uſed as " white marble, and appeared to be alabaſter, this " made me imagine, that when theſe ſorts of petri" factions are hard enough to receive a poliſh, they " then become the oriental tranſparent alabaſter, " which is ſo much valued, and of which there are " two curious columns at the high altar of St. Mark " in Venice." Perhaps Dr. Pococke does not here ſufficiently diſtinguiſh between marble and alabaſter; but I add his remark, merely to ſhew how valuable theſe incruſtations may become, and how much they deſerve not to be neglected.

I am,

S I R,

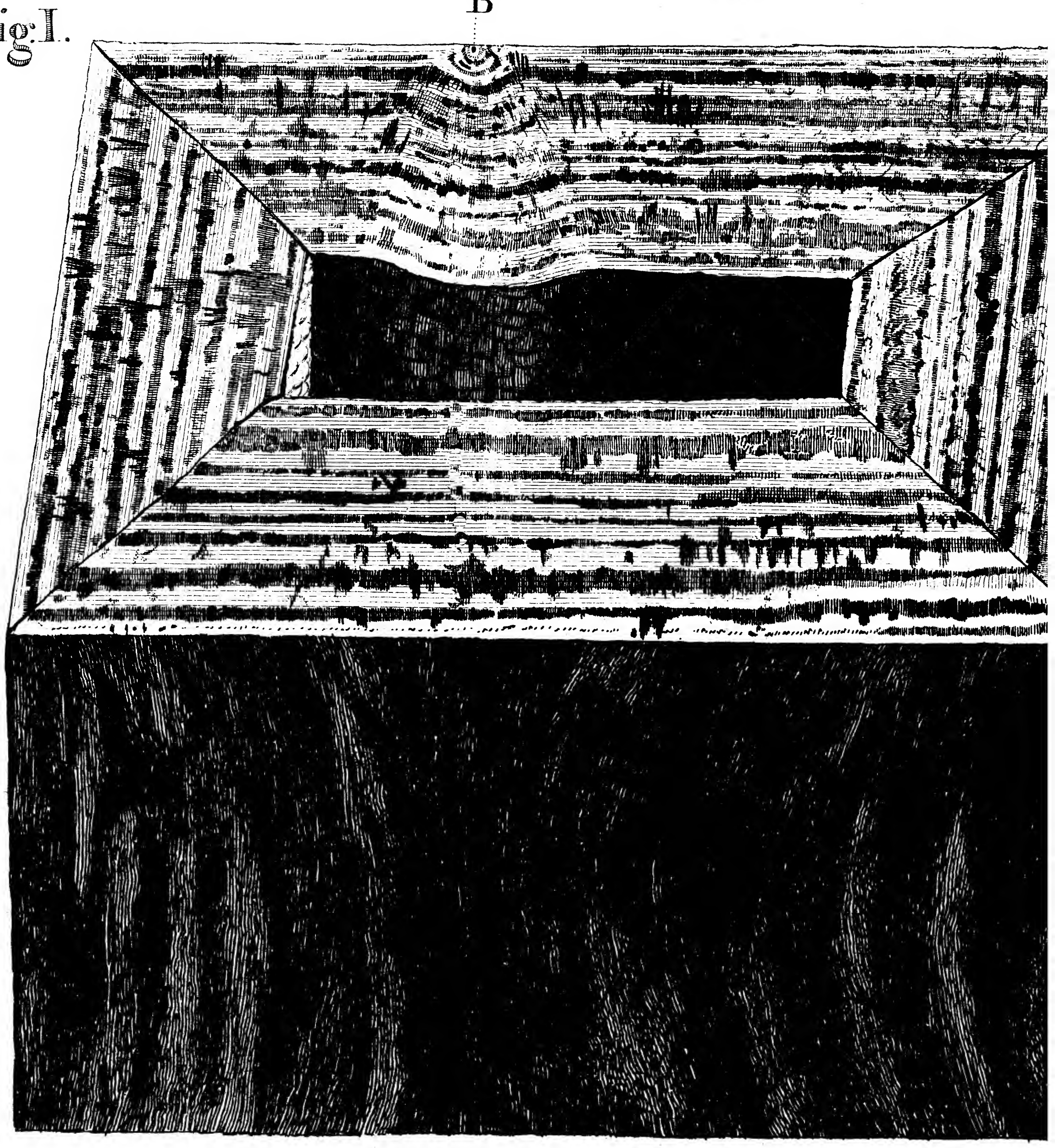
Very reſpectfully,

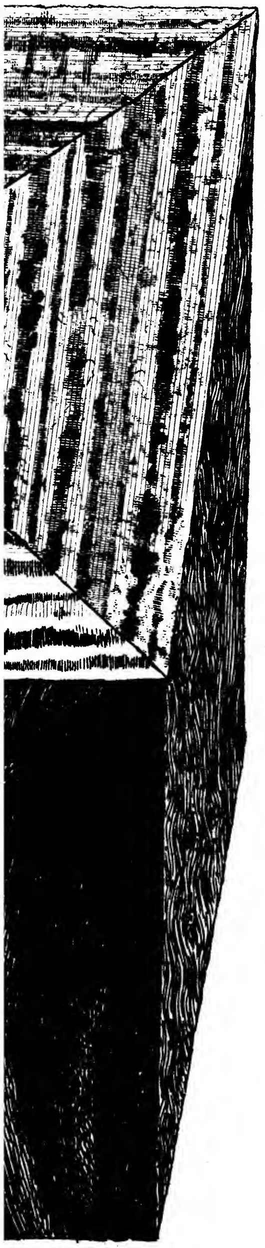
Your moſt obedient,

humble ſervant,

Edward King.

Fig. I.





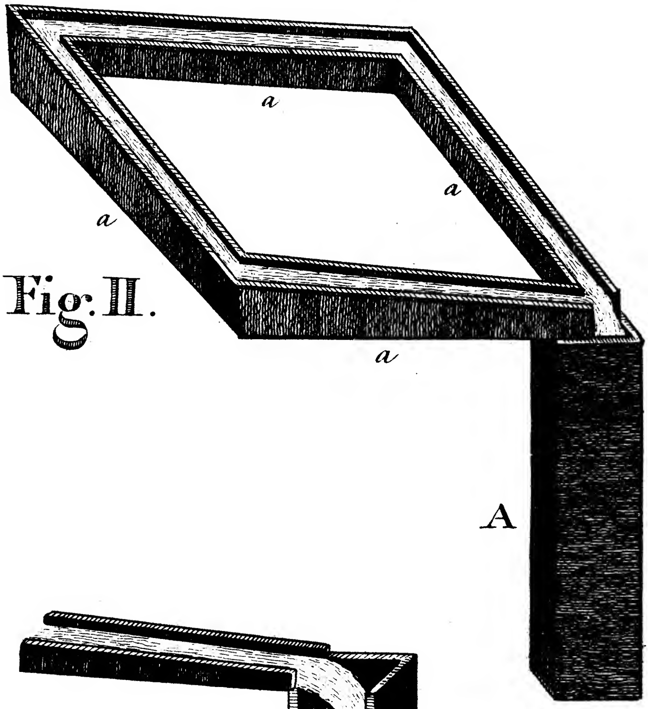


Fig: II.

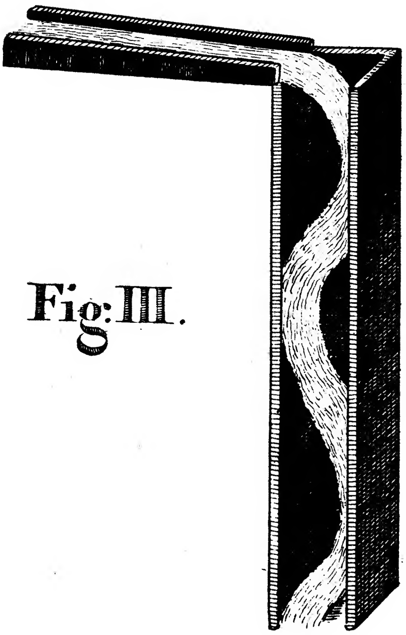


Fig: III.

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Fig I

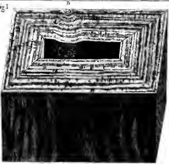

Fig II

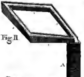

Fig III